

09/463929

420 Rec'd PCT/PTO 01 FEB 2000

APPLICATION
FOR
UNITED STATES LETTERS PATENT

TITLE: METHOD AND APPARATUS FOR PERFORMING
TRANSACTIONS

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METHOD AND APPARATUS FOR PERFORMING TRANSACTIONS

5 This invention relates to a method and apparatus for performing a transaction. It is particularly, but not exclusively, applicable to machines for vending products or services, such as beverage dispensers, food dispensers, payphones, gaming machines, etc. It is, however, also applicable to other machines such as currency dispensers, and machines simply for accepting payment, such as at a terminal in a shop.

10 It has been proposed that such machines should accept payment by means of "smart cards". i.e. payment tokens, generally credit-card shaped and sized, containing a memory and usually a microprocessor, which are machine-readable. It has also been proposed that certain types of such cards should store a credit value, which can be replenished in exchange for the owner
15 making a payment, and which is diminished in accordance with the value of a product or service received by the owner. The present invention relates to such cards. The term "card" will be used herein, but it is to be noted that this is intended to cover memory-containing tokens which need not be credit-card shaped and sized.

20 For convenience, all such machines are referred to in the following as "vending machines".

The owner of a vending machine or the like which receives payment in the form of credit received from cards needs a way of retrieving that payment from the vending machine. One proposal is that the vending machine should store an accumulated value representing the total credit deducted from the cards in payment for products or services. An operator or serviceman would be provided with means for reading out this accumulated value and storing it in a removable device, preferably a special smart card, the stored accumulated value being reset at the same time. The device can then be presented to a bank in exchange for the value stored therein.

10 This is a particularly convenient technique, because it uses the same technology as already exists for reading credit data from, and writing credit data to, a smart card. It is necessary in these circumstances, though, to store information which is used to identify those special cards which are used by operators or servicemen in order to retrieve the accumulated credit data, so
15 that this data is only given to authorised people.

One problem exists in that there is a possibility that a special card may be lost or stolen. Its unauthorised use would result in the loss of all the value stored in one or more vending machines, and, possibly, the use of the device which has collected the accumulated credit in other vending machines for
20 obtaining products or services.

To deal with this problem, it is necessary to reconfigure each vending machine whenever one of the special cards is lost or stolen, so that all the

relevant vending machines will no longer recognise these as authorised cards and will not transfer the accumulated credit data to those cards. However, reconfiguration is a relatively skilled job, using specialist equipment, and therefore it can take some considerable time until all the machines are reconfigured.

According to one aspect of the invention, a machine for accepting payment by diminishing the value of credit data stored on a card is operable to maintain a record of the accumulated credit value from a plurality of transactions, the machine storing identification data and being operable to use such data to recognise a card as a credit-downloading device, and thereafter to transfer the accumulated value to the credit-downloading device, the information data further including data to enable the machine to recognise a card as a downloading-preventing device, the machine being operable to prevent the downloading of accumulated credit data in response to recognising such a device.

Using these techniques, once a special downloading-card is lost or stolen, the owner of the vending machines can immediately issue a serviceman with a downloading-preventing card, i.e. a card with a predetermined identification number, and the serviceman can then visit the vending machines and prevent unauthorised downloading of data simply by inserting this card. This special downloading-preventing device will be referred to herein for convenience as a "stop card". Preferably, it is read using

the same card reader as is used for ordinary transactions, which is also preferably used for transferring accumulated data to the special downloading cards.

5 The inhibiting of downloading can take place by setting a flag within the machine, which is checked prior to each downloading operation. Alternatively, or additionally, this could be done by clearing the identifying-information used to identify the downloading cards, and/or by altering flags associated with the identification information.

10 It is envisaged that the use of the stop card for inhibiting downloading can be carried out quickly, easily and inexpensively. The machines can thereafter be reconfigured at a convenient timing, without worrying about unauthorised downloading of credit data.

15 A further problem for owners of vending machines of the type generally described above is the fact that, in order to perform testing, a serviceman generally has to be provided with a card storing a significant amount of value so that he can repeatedly initiate vending operations for testing purposes. These cards are therefore intrinsically valuable, and are open to misuse and represent a significant loss if stolen.

20 According to another aspect of the invention, there is provided a transaction machine which is operable to accept payment in the form of credit value transferred from a card, the machine storing information to enable it to recognise a special test card, and being operable in response to recognising

such a card to vend a product or perform a service without requiring payment from the test card. The machine can either deduct the payment value from the test card prior to vending the product or performing the service, and then refund the value, or can vend a product or perform a service without deducting credit data from the card. The former is preferred, because it tests more of the conventional operations of the machine.

According to this aspect of the invention, the test card need not have any stored credit data and thus would have no intrinsic value, or if it does store credit data this can be limited to the value required for a single transaction. Furthermore, the "free vending" operation would be allowed only in those machines which store the appropriate identification data. Accordingly, the consequences of misuse or loss of the test card are substantially reduced.

If desired, the "free vending" operation can take place only after the serviceman has switched the machine into a test mode, for example using a key. Additionally, or alternatively, the machine can be arranged to store an indication of how many free vends have been provided.

An arrangement embodying the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows schematically a vending machine in accordance with the invention;

Figure 2 illustrates the contents of a memory storing registration information; and

Figure 3 is a flowchart of the operation of the machine.

Referring to Figure 1, a vending machine 2 has a product vending
5 section 4, a card reader 6, a control unit 8 and an input/output unit 10
comprising a display and a keyboard. A customer inserts a smart card such as
that shown at 12 into the card reader 6. The card reader 6 then reads the credit
value from the card 12 and the control unit 8 causes this to be displayed on the
display of the unit 10. The customer can then operate the keypad of the unit
10 10 in order to select a product for vending. Before the product is vended, the
value stored on the card 12 is cancelled and an amount corresponding to the
initial value minus the value of the vend is written onto the card 12.

The machine 2 stores an accumulated credit value corresponding to the
total amount deducted from the cards inserted into the machine. In the present
15 embodiment this is achieved using an interface unit 14 in the form of a second
card reader, and an internal smart card 16. Each time a value is deducted from
an inserted card 12, that value is added to the credit stored on the internal card
16.

When an operator wishes to retrieve the payment made by the
20 customers using the machine, a special downloading card 18 is inserted into
the card reader 6. This special card is recognised by the control unit 8, which
then causes the amount stored on the internal card 16 to be added to the

amount currently stored on the downloading card 18, and the amount stored on the card 16 to be reduced to zero. The downloading card 18 can then be taken away and ultimately handed into a bank in exchange for the amount stored thereon.

5 In the event that a downloading card 18 is lost or stolen, a serviceman is given a special stop card 20 which he takes to each of a number of vending machines in turn, and inserts it into the card reader 6 of each machine. This is recognised by the unit 8, and is used to disable the downloading function of the machine. The control unit 8 has a memory 22, the contents of which are
10 illustrated schematically in Figure 2. The memory stores a plurality of identification numbers indicated at 24 and, associated with each identification number, a flag 26. Whenever a card is inserted either into the card reader 6 or the interface unit 14, this memory is checked to determine whether an identification number stored by the card matches any of those in the memory
15 22. If so, then the machine takes appropriate action depending upon the flag 26 associated with that card.

 In particular, the unit 8 will only accept as valid a card 16 which has associated therewith a flag indicating that it is valid for internal use (such flags being indicated as "I" in Figure 2).

20 If a serviceman wishes to test the apparatus, he can do this using a special test card 28 which is inserted into the card reader 6. Preferably, prior to the testing operation, the serviceman unlocks a cabinet of the vending

machine and operates a switch 30 (which may be operated automatically by the unlocking and/or opening of the cabinet). Upon insertion of the card 28, the unit 8 reduces the value on the card 28 and adds it to that on the card 16, as usual, and permits a vend. However, following the vend, the value is then
5 taken off the internal card 16 and added to that stored on the test card 28, so that the original value is restored. The value is thus held in escrow during the transaction by the internal card 16.

Referring to Figure 3, the control unit 8 operates as follows upon insertion of a card in the card reader 6.

10 After the start operation 300, the unit tests that the card is valid at step 302. and at the same time reads its identification number. Assuming that the card is valid, the program proceeds to step 304 to check whether the identification number is stored in the memory 22. If not, a conventional vend operation, including reading of the credit data, re-writing of reduced credit
15 data and vending of a product, takes place at step 306.

If the identification number is recognised, the program proceeds to step 308 to test whether the flag 26 associated with the identification number is "D" representing a downloading card 18. If so, a downloading operation takes place at step 310, resulting in the credit on the card 16 being reduced to
20 zero, and that on the card 18 being increased correspondingly.

If the identification flag 26 is not "D", the program proceeds to step 312 to check whether it is "S", corresponding to a stop card 20. If so, the

program proceeds to step 314, where the control unit 8 alters all the flags "D" to some other value, e.g. "X". Alternatively, the unit 8 clears the contents of all memory locations 24 corresponding with flags "D". Either operation would ensure that future insertion of any downloading cards will be ineffective. As a
5 further alternative, an internal flag within the program routine could be altered so that steps 308 and 310 (or just 310) are omitted in future executions of the program.

If, at step 312, the flag is not recognised to be "S", the program proceeds to step 316. Here, the unit 8 checks whether the flag corresponds to
10 "T", indicating a test card 28. If so, the program proceeds to a vend operation 318, corresponding to the vend operation 306 described above. Following that vend operation, at step 320, the amount deducted from the card during step 318 is refunded, as described above.

If desired, the program could check that the switch 30 has been
15 operated (indicating that the machine has been switched to a test mode) and perform steps 318 and 320 (or step 320) only if this condition is detected.

The program routine terminates at step 322 if the card is found invalid (at step 302), after a vending operation (at step 306), after the appropriate operation following detection of a flag "D", "S" or "T", or if no valid flag is
20 detected.

If a stop card 20 has been used, then an appropriately authorised serviceman can, at a later date, restore the downloading option by, e.g.,

connecting to the machine a computer or hand-held terminal. This will restore any flags altered by the routine 314, but erase identification information relating to the stolen or lost downloading card. To facilitate this operation, and avoid the need for the computer or terminal to store all the identifying
5 information for other authorised downloading cards, it is preferred that step 314 should not erase this identifying information.

If desired, the test card 28 can store an expiry date, and the machine can be arranged to allow a "free vend" only after checking that this expiry date has not been passed. Additionally or alternatively, the card may store a
10 number which represents the number of permitted "free vends" and which is checked by the machine, and altered each time a "free vend" occurs.